

REMARKS

The Applicant thanks the Examiner for his attention to this case and for his detailed comments on the applicability of the prior art.

The Applicants have amended the claims previously on file to incorporate the subject matter of claim 3 into claim 1, to delete the set of claims 25 through 42 and to further clarify the language with respect to claim 43 and the claims dependent thereon. It is believed that these amendments overcome the objections raised by the Examiner and place the application in condition for allowance.

1) Claim Rejections - 35 USC § 112

The dependency of claim 17 has been amended to refer to claim 16 as suggested by the Examiner.

Claim 32 has been deleted and accordingly the objection to claim 32 is moot.

2) Claim Rejections - 35 USC § 102

The subject matter of claim 1 has been amended to incorporate the subject matter of claim 3. Accordingly, the objections under 35 USC 102 on the basis of Heyl are believed to be moot in that the Examiner did not apply Heyl against claim 3.

The rejections of claims 1, 12, 16, 17, 20 through 33 on the basis of Dantrew are believed moot for similar reasons.

Claim 43 has been amended to further distinguish Dantrew. Claim 43 as originally filed recited that the convex abutment provide a rolling engagement of the motors as a swashplate is adjusted. This is explained more fully in the specification with respect to Figure 13 and avoids any sliding motion between the end faces of the motors and the reaction points on the swashplate as the swashplate is adjusted. It is quite clear from Figure 3 of the Dantrew reference that movement of the swashplate from the position shown in Figure 3 will require a sliding motion between the abutment 68 and the end face of the piston 62. Dantrew is silent as to any provision to avoid such sliding motion. Claim 43, as amended, further emphasizes the distinction by reciting that the abutments are positioned on the planar face relative to the axis of rotation and the end faces so as to roll across the end face of the motors as the swashplate is adjusted and thereby inhibit relative sliding there between. Such an arrangement is not disclosed in the Dantrew reference and as such, the rejection under 35 USC 102 is believed to be overcome.

The Examiner has rejected claims 1 through 5, 12 and 14 through 17 as being anticipated by Ankeny. Ankeny discloses a swashplate machine with a bearing between a fluid bearing is provided between the support plate 170 and the bearing plate 197 shown in Figure 9. Fluid for the bearing is supplied through holes 186, 186' from a supply duct 160 shown in Figure 8. The pressure supply is provided from the outlet of the pump 134 and fed through internal galleries to the bearing supply passage 160. Thus, the fluid supplied to the bearing is supplied directly from the outlet 134. The fluid from outlet 134 is also fed to a shuttle valve 152 that is used to control the stroke of the machine. The valve 152 is provided to pressure compensate the pump so as to maintain the pressure delivered by the pump at a predetermined pressure.

Claim 1 as amended requires the provision of a pressure compensating flow control valve to maintain a predetermined flow of fluid as pressure at the port varies. The purpose of the flow control valve as exemplified in the specification is to ensure that a constant flow of fluid is supplied to the bearing (see page 8, paragraph 56). Such an arrangement is not shown in Ankeny where no valve is provided between the outlet of the port and the fluid bearing. As a result, the fluid flow to the bearing area of the Ankeny reference depends upon the pressure supplied at the port and the physical clearances between the bearing and support plate. The Ankeny reference assumes that when the system pressure changes, the balance forces acting on the swashplate will also be required to change. It is assumed that the balance force is proportional to piston forces based on the same system pressure. However, due to variations in bearing gap, this is not true. As such, under certain conditions, the bearing is under supplied with fluid.

By contrast, the provision of the pressure controlled flow control valves as described in the present application ensures that the bearing area is supplied with a continuing flow regardless of the loading conditions and pressure delivery conditions of the machine.

Ankeny does not disclose the pressure compensated flow control valves recited in claim 1 and accordingly is believed not to anticipate claim 1 and the claims dependent thereon.

The Examiner has rejected claims 1 through 5, 12 and 14 through 16 as anticipated by Thoma. Thoma discloses in Figure 3 a valve and orifice combination to control the supply of oil to the fluid bearing between the swashplate and housing. However, as described above with respect to the Ankeny reference, Thoma does not show a pressure compensated flow control

valve that maintains a predetermined flow of fluid as pressure at the port varies. The fluid flow through the orifice b will vary as the pressure in the ports change and accordingly, the flow rate of fluid to that bearing will also vary. Accordingly, claims 1 through 5, 12 and 14 through 16 are not believed to be anticipated by Thomas.

Claims 25 through 27 have been deleted and accordingly the objections raised under 35 USC 102 are believed to be moot. The Examiner has objected to claim 43 in view of the reference to Bethke. As discussed above with respect to the rejection on the basis of Damtrew, claim 43 has been amended to further clarify the recitation of the rolling engagement between the actuators and abutments. As can clearly be seen from a comparison of the position of the abutments in Figure 3 and 4, the Bethke reference contemplates a sliding motion between the end face of the pistons and the abutments. Accordingly, there was no disclosure on the rolling contact recited in claim 43 and as such the rejection under 35 USC is believed to be moot.

3) Claim Rejections 35 USC § 103

The Examiner has rejected claims 2 through 5, 14, 15 and 34 through 37 as unpatentable over Damtrew in view of Thoma. The deletion of claims 34 through 37 renders the objection in respect of these claims moot.

As acknowledged by the Examiner, Damtrew does not disclose the provision of the pressure compensated flow control valve previously recited in claim 3. The Examiner believes that Thoma teaches such a valve. However, as noted above, Thoma does not teach a pressure compensated flow control valve that maintains a predetermined flow of fluid as pressure at the port varies. Thoma discloses an orifice that by its very nature varies the flow rate as the pressure drop across the orifice varies. Accordingly, the flow of fluid to the fluid bearing is not maintained at a predetermined rate as the pressure varies.

Neither Damtrew nor Thoma therefore teach the provision of a pressure compensated flow control valve and as such their combination, even if made, would still not result in the invention as claimed in claim 1 and the claims dependent thereon.

The Examiner objected to claims 7 through 11, 13 and 48 through 52 under 35 USC 103 as unpatentable over Damtrew in view of Jepsen. The amendment to claim 1 to incorporate the subject matter of claim 3 is believed to render this objection moot. It is noted that claim 7 previously dependent upon claim 1 and that no rejection of claim 3 in view of this combination

was made. As discussed above, and as acknowledged by the Examiner, Damtrew does not disclose the provision of a pressure compensated flow control valve and Jepsen is likewise silent in the provision of such an element. Accordingly, it is believed that the combination of Damtrew and Jepsen does not teach the invention claimed in claim 1 and therefore does not render obvious claim 7 to 11, and 13 dependent thereon.

With respect to the rejection of claims 48-52 on the basis of Damtrew in view of Jepsen, it is noted that claims 48-52 depend on claim 43. As discussed above with respect to the rejection under 35 USC 102, Damtrew does not disclose the provision of the rolling contact between the abutments and the end face of the motors recited in claim 43. Similarly, Jepsen does not disclose such an arrangement. Accordingly, the combination of Damtrew and Jepsen does not teach the subject matter claimed in claims 48 through 52 and as such, the rejection under 35 USC 103 is believed inappropriate.

The Examiner has rejected claims 44 to 46, 53 and 54 under 35 USC 103 as unpatentable over Bethke in view of Blasutta. It is noted that these depend directly or indirectly upon claim 43 and as such, it is believed that Bethke as discussed above, does not teach the rolling contact recited in claim 43. Blasutta discloses a swashplate mechanism with a pair of bearings 75, 77 engaging the end face of the adjusting pistons. The provision of these bearings indicates clearly that the arrangement of Blasutta does not contemplate a rolling engagement but rather contemplate a sliding engagement between the end face and the abutments which is then accommodated in the bearing structure between the cylindrical abutment and the central support 77. Accordingly, Blasutta rather than teaching the provision of a rolling contact, in fact teaches directly opposite in that it makes provision for accommodating such sliding contact. Accordingly, it is believed that the combination of Bethke and Blasutta do not teach or suggest the provision of a rolling contact between the abutments on the swashplate and the end faces of the piston. Accordingly, it is believed that the rejection of claims 44 to 46 and 53 and 54 in view of the combination of Bethke and Blasutta is improper.

The Examiner has rejected claims 24 and 43 through 47 and 53 in view of the combination of Heyl with Bethke. Neither the Heyl reference or the Bethke reference disclose the provision of the pressure compensated flow control valve recited in claim 1 upon which claim 24 is dependent. Accordingly, the combination suggested by the Examiner would not

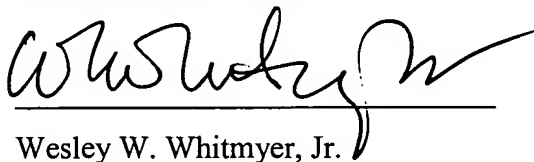
teach the invention claimed in claim 24 and the objection is believed to be overcome.

With respect to the rejection of claims 43 through 47 and 53, as discussed above, neither Heyl or Bethke disclose the provision of the rolling contact between the end face and the abutments on the swashplate. The amendment to claim 43 is believed to emphasize this feature. It should also be noted that Heyl cannot envisage such rolling contact in view of the need to supply fluid pressure to the bearing through the adjustment piston rods which requires a captive and therefore sliding motion between the piston rods and the swashplate as shown in Figure 1 of the Heyl reference. Accordingly, the modification of Heyl and Bethke to incorporate a rolling action between the end face and the abutments would require a wholesale redesign of the principle reference to Heyl and as such is not believed to render the claim obvious. Accordingly, the objections to claims 43 through 47 and 53 are believed to be overcome.

The Examiner has also rejected claims 17 through 19 in view of the combination of Heyl and Okuda. It is believed that the amendment to claim 1 to incorporate the subject matter of claim 3 renders this objection moot in that neither Heyl nor Okuda teach the pressure compensated flow control valve recited in amended claim 1. Accordingly, the combination suggested by the Examiner does not teach or suggest the invention recited in claim 17 through 19 which are therefore believed to be allowable.

The allowability of claim 6 is noted with appreciation. It is believed that the amendments made to the claims presented herewith render the balance of those claims allowable and further action to that end is respectfully requested.

Respectfully submitted,



Wesley W. Whitmyer, Jr.
Attorney for Applicant
Registration No. 33,558

St. Onge Steward Johnston & Reens LLC
986 Bedford Street
Stamford, CT 06905-5619
U.S.A.